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Contributing to Functionality - The Case of a Network of Union Educators

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Abstract. The objective of this paper is the design of computer supported joint action spaces. It is argued against a view of functionality as residing in computer applications. In such a view the creation of functionality is equivalent to the creation of computer applications. Functionality, in the view advocated in this paper, emerges in the specific dynamic interplay of actors, objectives, structures, practices and means. In this view, functionality is the result of creating, harnessing and inhabiting computer supported joint action spaces. The successful creation and further development of a computer supported joint action space comprises a whole range of appropriate design contributions. The approach is illustrated by the example of the creation of the computer supported joint action space "exchange network of voluntary union educators". As part of the effort a group of participants created and discussed a list of contributions to the design of their exchange network. Collecting and discussing potential and actual design contributions might be instrumental in designing joint action spaces.

Introduction

Often, functionality available in the context of a computer application is attributed only to this artifact itself. Authors from diverse backgrounds have argued that this view of functionality inappropriately abstracts from the constellations, actors, ingredients, networks etc. without which these artifacts would be pointless (cf. e. g. Suchman 2000, Latour 1999, Hales 1994). If it is true that this truncating attribution of functionality to the artifact is detrimental, it has to be counteracted: by reconstructing which sources of impact (just »the« designers?) contribute to what (just »the« application?) and in which ways (by just generating code?). The task of reflective designers is to carry these efforts even further: they should provide advice and methods which enhance conscious design practice, taking into account who (or what) contributes to the design and in which ways. A question of who or what reflective designers are arises. One answer is that they are people who are professional designers, occupy a design position, are educated in a design-related discipline and now, in their everyday-efforts derive hypotheses from/within their work environment, put them to the everyday empirical/practice test and revise these hypotheses if necessary (Schön 1983). A tentative answer to the question of what reflective designers are is that they are those who contribute to what is designed in a reflected manner. Immediately the question of what in fact is designed emerges.

In this paper it will be argued that functionality »resides« in specific joint action spaces and not in artifacts such as computer applications. The term "joint action space" here refers to a setting (or an environment or conditions) in which humans have specific possibilities to act. A first distinguishing feature between different joint action spaces is their objective (or purpose). Joint action spaces that have computer-support as a central feature are here referred to as computer supported joint action spaces.

The shift of perspective toward the joint action space and away from the computer artifact as locus of functionality implies a shift of perspective regarding the design of functionality. The design of functionality then is the design of the joint action space and not the creation of an artifact such as a computer application.

In order to understand the design of joint action spaces it is necessary to regard a range of sources of impact such as

- actors: those who contribute, actually or potentially, who are part of the effort and who are affected by it;
- objectives, content, goals, aims: what is to be achieved;
- structures: institutions, organizations, social settings in which the effort occurs;

- practices: what the involved actors actually do related to the effort;
- artifacts, means: in our case computer applications, but also other means and artifacts which are (or are to be) designed, used or further developed in relation to the objective.

In the framework developed in this paper, it is assumed that functionality is the result of dynamic interactions that are specific depending on who or what exactly these sources of impact are in the case regarded. Taking these sources of impact into account means that a whole range of contributions to the design of joint action spaces has to be expected.

What has been said so far is relevant for reconstructing and understanding sources of impact and contributions. What the authors aim at is to provide a proactive framework for designing functionality. The appropriate design of joint action spaces necessitates that all the relevant contributions are appropriately taken into account, appreciated and integrated. What is in fact relevant depends on the specific joint action space to be designed. The notions of »the« designer and »the« user have to be replaced by notions of different contributors and contributions to functionality-in-practice. Actors aware of their actual and potential specific contributions according to their backgrounds, interests, responsibilities etc. might be able to live more fully up their own standards. Currently, effective and taken-for-granted assumptions, structures, practices, artifacts (»infrastructures«) etc. limit the degrees of freedom for building functionality according to legitimate objectives. Conscious designers could scrutinize whether all these restrictions are in fact necessary for their particular efforts or whether (and how) some of them could easily be challenged.

The design approach advocated here is rooted in Participatory Design and in some respects similar to other approaches, such as ethnomethodologically informed design studies (e. g. Heath & Luff 2000), tailoring and end-user programming approaches (e. g. Henderson & Kyng 1991, Nardi 1993), "evolving use of groupware" (Andriessen et al. 2003) or, more general, "design-in-use" studies (e. g. Törpel et al. 2003, Dittrich et al. 2002) and participatory action research (cf. e. g. Whyte 1991):

- Ethnomethodologically informed design studies stress specificity and multiplicity of practices.
- Tailoring and end-user programming approaches are proactive in that they guide a kind of design of computer applications that allows users to modify the applications according to their real-life needs.
- "Evolving use of groupware" and "design-in-use" studies occasionally stress multiple contributions to the application-in-use over time.

- Participatory action research actively involves the different groups of people who are affected by the phenomena studied in order to shape them according to their needs and preferences.

All these approaches hence contain assumptions that resemble assumptions of the framework introduced here. At the same time they do not aim at creating computer supported joint action spaces but mostly computer applications; an exception is participatory action research which usually does not focus on any computer-related design activity at all.

In the following two main sections of this paper the proposed approach of designing computer supported joint action spaces instead of computer applications is illustrated by the example of the attempted design of a network for exchange amongst union educators. The following section contains the description of this effort – including descriptions of actors, objectives, structures, means and practices. In the last subsection of this next section the empirical approach for getting knowledge about the effort will be described. After this, another main section is structured by a list of design contributions that was generated as part of the design efforts. This kind of list is expected to be helpful as a means for designing joint action spaces. In the concluding sections the implications of the framework in relation with the phenomena studied will be explored.

Illustrative Example and Empirical Approach

Plans and ideas for creating a network for exchange and collaboration amongst voluntary union educators of an industrial union in a particular German state have existed for several years. Even though the ideas have resulted in concrete networking efforts the network is still in a provisional state. In the late nineties the attempts at creating the educators' network eventually included the search for suitable computer means. The characterizations of this effort at creating the computer supported joint action space "exchange network of voluntary union educators" are meant to exemplify and support the framework suggested above. In the first subsections sources of possible impact (grouped as actors, objectives, structures, means and practices) are depicted. They are assumed to impact the joint action space in dynamic interaction. In these processes the authors became involved as researchers. The empirical approach chosen in order to acquire knowledge about the efforts toward creating the network will be described in the last part of the section. In the next section a number of factual contributions to the joint action space will be listed and described.

Actors, involved persons, affected persons

Actors in the effort of creating an exchange network of voluntary union educators comprise different groups:

- Voluntary educators of the union in this German state (about 150 of them have been actively involved in one or the other way).
- Members of the union in this state who find union education work, networking of union members and/or internet use in the union important: this group comprises the subgroups of full-time union educators, professional union activists and active »mere« union members. The effort became part of a publicly funded two-year project on internet use in union education. In this context actors can be divided into project staff and voluntary project contributors.

Objectives, content, aims, goals

The involved actors followed a variety of objectives. They have not always been entirely converging. They comprise

- having voluntary union educators exchange and collaborate within a computer supported exchange network,
- creating a large pool of good materials for courses,
- bringing about massive use of and traffic in a particular collaborative computer application in which participants can access and copy material and in which participants can load material of their own,
- raising the educators' level of knowledge,
- increasing the number of educators who are able to teach the use of computers, computer applications, the internet and the web,
- increasing the number of educators who are able to use computers, computer applications, the internet and the web,
- promoting communication, cooperation and learning among educators, so that they for example can serve as role models for the participants of the courses they teach.

Structures, institutional conditions, context

Structures that are relevant for the union education networking effort are structures within the field of voluntary union education and structures related to the publicly funded project on internet use for union education. The voluntary union educators in the regarded union are assigned to regions within the state. The volunteers can only offer courses which fall into a number of categories (e. g. protective labor legislation, employees, workers representatives, youth activists).

A few times per year local volunteers meet in their regions, supervised by union education professionals. Volunteers are invited to attend a state-wide union education conference twice a year.

The publicly funded project on the use of the internet in the context of union education work lasted two years. During this time the networking effort was coordinated by a full-time project staff member who spent a great portion of his project time with the effort. He visited the regional groups and recruited voluntary members of a circle of persons who became active for or interested in the networking effort. This circle in fact formed and comprised about 50 people. As a substructure of this circle a steering committee was established which comprised the about 15 most active persons. The steering committee has since met every about two months, even after the publicly funded project ended. The members of the steering committee serve as contact persons, generate ideas for how to proceed, assign and work on tasks, evaluate the results, and exchange and circulate information related to the networking effort.

Artifacts, means, computer applications

A number of means played a role in the networking effort, among them:

- several web-based groupware applications with protected web areas in which files can be uploaded from and downloaded to local computers: participants either had installed them in their environments or had had the opportunity to use them in other settings;
- one of these systems, a shared workspace system, was eventually chosen and a networking workspace was set up (see below): many actors have perceived this system or the workspace itself as the center-piece of the union educators' networking effort;
- a web-site which has served as an entry point into the protected web areas and as a tool for registering as a member of the workspace;
- the intranet of the union which has been accessible only to individuals employed by the union;
- a presentation for explaining and advertising the networking effort and for recruiting workspace members: it contains a series PowerPoint slides and a short introduction into the use of the shared workspace system by means of a networked notebook computer, a browser, the shared workspace systems and a video projector;
- a bimonthly email newsletter for informing and activating the workspace members and for recruiting new activists and workspace members.

Practices

Various practices have been instrumental in creating and further developing of the joint action space "exchange network of voluntary union educators", for example:

- downloading and uploading course materials,
- registering for the shared workspace via the website,
- giving and listening to presentations,
- discussing next steps in the steering committee and other meeting practices at gatherings such as steering committee meetings, conferences, local exchange meetings,
- setting up the directory structure of the workspace,
- defining important actions guided by the objectives of the joint action space,
- providing technical assistance via email or telephone,
- teaching or attending introductory seminars to the use of the workspace, the web, the internet, the computer,
- editing texts such as course materials,
- preparing courses with and without computer support,
- emailing between different actors,
- assembling, distributing and reading the networking newsletter,
- collaborating with various union committees in the state and
- grant writing for related follow-up projects.

Empirical approach

The full-time member of the project on internet use in union education of which the networking effort was a part asked whether the authors would like to join the effort as participating researchers. The authors agreed and a collaboration was established in the form of a project cooperation between his practice project and the research project in which the authors worked. The research project addressed, among other objectives, questions of how the shared workspace system used for the networking effort was appropriated in a variety of distributed collaborative settings. The objectives of the collaboration between the union project and the research project included

- exchanging information and feedback related to the networking activities,
- initiating contact between the union networkers and the developers of the shared workspace system,
- generating practically relevant ideas from different perspectives.

The authors' approach to the research comprised

- analyzing documents, such as the minutes of the steering committee, proposals and reports, contents of the workspace and the website and advertising material,
- analyzing the structure of the workspace,
- participating in meetings, such as steering committee meetings, a conference of union educators in the state, and various meetings of voluntary union educators who are involved in the networking effort with diverse objectives,
- conducting 15 interviews with different contributors to and participants of the networking effort: project staff, voluntary project contributors and full-time and voluntary union educators,
- communicating with participants of the networking effort via email and telephone.

Contributions to the Joint action space "Exchange Network of Voluntary Union Educators"

In the introductory section it was argued that the »locus of functionality« is the whole joint action space and that designing functionality usually comprises many contributions. In this section a number of contributions to the computer supported joint action space "exchange network of voluntary union educators" will be described. Interestingly, the authors witnessed a steering committee meeting in which, as part of a discussion of how important the workspace was a steering committee member began to generate a list of contributions to the networking effort. In doing so, his aim was to challenge the view of some other committee members that the workspace was the center-piece of the networking effort. In the course of the discussion other members modified and extended the list and wrote short descriptions of the items.

The resulting list contains the items:

- creating computer applications,
- choosing suitable means,
- extending, embedding and integrating computer applications,
- tailoring,
- entering data into the system,
- designing future practices,
- practices.

The sub-headings in this section follow this list of design contributions the members found relevant, and it will be argued that this list can serve as a checklist for action space design activities and the integration of the contributions/results. Some of the mentioned design contributions are common and will emerge in

many design efforts for computer supported joint action spaces. Others are specific for the regarded setting and maybe only a few other design efforts. This means that the checklist must be modified for other efforts to design computer supported joint action spaces.

Creating computer applications

An integral part of computer supported joint action spaces are computer applications. Therefore the development of these computer applications or versions of computer applications is an integral contribution to these joint action spaces. The development of computer applications is often removed from joint action spaces for which they are relevant which necessitates various other contributions to the design of action (see below, cf. Robertson 1998). In the example of the union educators' networking effort several groupware tools that had been created in various locations and that participants knew served as a pool of systems among which a choice had to be made.

Choosing suitable means

The processes of choosing suitable means for the networking effort have been diverse. One means to be chosen was a web-based groupware for exchange. One such system was experimentally used for various efforts under the umbrella of the project on internet use for union education. As a result, the steering committee for the union educators networking effort rejected the system as a means for their effort. They requested that either the system was to be modified in important ways or that they were allowed to introduce and experimentally use another system. The groupware system they eventually introduced and which they have used is a web-based shared workspace system. The system makes it possible to up- and download electronic objects (such as electronic representations of texts, figures, weblinks, presentations and much more) from and to local networked computers, from and to the web (or computer networks) with a web browser. (Some of the many other system features will be mentioned below.)

Extending, embedding and integrating computer applications

Typically, computer applications have to be extended, embedded and/or integrated into already existing infrastructures. Components have to be added (e. g. for knowledge management, e-learning, e-commerce), interfaces have to be created (e. g. web interfaces, WAP) and applications for different areas (e. g. production, planning, marketing) have to be interconnected.

As part of the creation of the joint action space "exchange network of voluntary union educators" a website was added for extending and embedding the system. It can be used as an entry point into the shared workspace, provides the possibility

to register as a member of the workspace and gives an overview over the current content of the workspace.

Tailoring

Many current large computer applications provide users with the possibility to choose between alternative features of the application by changing system parameters. Applications with this possibility are called tailorable (e. g. Henderson & Kyng 1991). One way of end-user activity for modifying the system is end-user programming (e. g. Nardi 1993). The activities that can be followed by the aid of the system depend on chosen system parameter values. Tailoring hence contributes to the actual practical functionality of the computer supported joint action space.

For the web workspace used as part of the union educators' networking effort, tailoring brought about major changes in the possibilities and practices of the members. When the project staff member who coordinated the networking effort set up the workspace he assigned different access rights to different groups of workspace members. The administrators including himself had more rights than ordinary workspace members. He explicitly denied most workspace members the right to delete files in the workspace. When changing the system parameters accordingly, he did not realize that denying the possibility of deleting files was, as a system parameter default, coupled with the denial of other use possibilities. The consequence was that most workspace members could, for example, not access an electronic list of workspace members and the short self-descriptions of members (with their email addresses). The list makes it especially easy to send emails with attached workspace contents to groups of other workspace members. They also could not subscribe to a workspace service in which the workspace system server automatically lists the workspace transactions (such as down- and uploading of files) of each day and sends these lists via email to subscribers after midnight. At some point the rights of most members were changed so that they could access the members' list and the short descriptions and could subscribe to the daily workspace activity report. Within a few days the number of down- and uploads and the number of down- and uploading workspace members increased drastically: from about 10 to about 100 downloads per month, from about 5 to about 30 uploads per month and from about 6 to about 20 active workspace users. In the interviews and conversations soon after the access right modification participants said that after the change they wrote and received many emails informing others about interesting new contents in the workspace. This indicates that tailoring activities can bring about major changes in computer supported joint action spaces.

Entering data into the system – determining shape and content of the data

In many computer applications data can be entered, transformed and stored. These data represent different contents. The data often can be structured on various levels (e. g. data structures, folder structures). The kind of data in the application partly corresponds with the actions suggested by the joint action space to which the application belongs.

The steering committee in the union educators' networking effort elaborated a folder structure for the workspace, and members of the steering committee accordingly set up the folders. The structure of the folders followed the categories for the content areas in which the voluntary educators of this union could offer courses. Each of these folders has two sub-folders, one for those materials that have not been edited or approved by a group of editors (see below) and one for materials that have.

Designing future practices in the joint action space

At various points of designing joint action spaces the involved actors build concepts. Computer design specialists (attempt to) anticipate constituents and qualities of the future outcome, inscribe qualities, scripts, assumptions etc. to which future users have to subscribe if they are to benefit (cf. e. g. Akrich 1992 for this kind of theoretical framework). Managers who are in charge of introducing computer applications have concepts about how the work will change when the technology is in use, e. g. with respect to flows of work, work organization or cooperation. Concepts and related measures influence the ways in which someone can act within the emerging joint action space, here e. g. the participants and the target groups of the networking activities.

In the union educators' networking effort the steering committee conceptualized various kinds of (then future) practices. One vision was a workspace with a large number of participants, a large number of files and many down- and uploads. Another vision was that voluntary union educators collaboratively created and improved course materials. An important decision for the joint action space followed a concept of "good" content: a group of editors was formed. Their task was to approve or, if necessary, improve course materials in the workspace. For each course content folder, unapproved materials remained in the subfolder "unapproved" and approved/improved materials were moved into the subfolder "approved". Other concepts for action in the joint action space concerned advertising, resulting e. g. in recruitment presentations and the email newsletter practices, and the level of computer knowledge, resulting e. g. in introductory computer, internet and shared workspace system courses for members of the networking target group.

Practices in the joint action space

Not surprisingly, there are practices which have consequences for the emerging or evolving shape of the joint action space. These practices can be collective, group specific or individual. For the emerging joint action space "exchange network of voluntary union educators" many practices have had this potential, for example:

- down- and uploading specific files and creating of certain folders,
- combining the use of means such as workspace, email, ICQ, telephone,
- discussion and facilitation practices in meetings and workshops, e. g. of the steering committee or groups of voluntary union educators,
- advertising, recruiting or training activities.

The practice of introductory courses to the use of the shared workspace system provides a noticeable example. For more than a year, the workspace trainings for networking-interested educators could not take place in rooms with networked computers on which the participants could practice. This was the case because the union's education centers did not have many of these rooms. Accordingly the usual form of introductions to the use of the shared workspace system consisted in a PowerPoint presentation and a demonstration of the workspace. For the demonstration the instructor used a networked notebook computer and a video projector, started the web browser and logged into the workspace. The audience could see what the workspace looked like and some of the possible user activities, such as down- and uploading objects, contributing to discussions, subscribing to the email report of the daily workspace activities, looking up another member's email address and emailing members from the members' list. Eventually, one of the union's education centers set up a large pool of networked computers. Soon afterwards another introductory course to the shared workspace system took place. After a while all participants succeeded in logging into the workspace with their user-IDs. It soon became obvious that their access rights did not allow them to subscribe to the daily workspace activity reports and to access the members' list, the short descriptions of members and their email addresses. It turned out that the presenters, who all had administrator rights, had not noticed this because they had always presented the workspace as it was set up for themselves and not for most members. They had not sufficiently explored what a workspace looked like and allowed for from the perspective of most members. Besides changing the access rights for most members (see above) the administrators created user-IDs with non-administrator profiles for themselves. This way they could experience and explore the possibilities of the workspace that most members had and thus give more accurate advice.

Conclusion - The Reflective Design of Joint Action Spaces

In this text it has been argued that

- computer supported joint action spaces and not computer applications bear functionality,
- the design of functionality should be geared towards computer supported joint action spaces instead of computer applications,
- this design is impacted by multiple sources specific for the respective joint action space,
- multiple and specific design contributions result in specific joint action spaces and
- contributors should reflect their agendas, individually and collectively.

The proposed list of sources of impact and the generated list of design activities can be used as checklists for real-life efforts at generating and further developing computer supported joint action spaces. The list of design contributions discussed in this paper can be used as a starting point, but any projected joint action space will have its own range of meaningful contributions. Of course, a list of contributions can always endlessly be extended. This is due to the fact that society, artifacts and joint action spaces always have a history and a historically formed wealth of meanings, references and interconnections. The differentiated societal division of labor and hence the societal cooperative structure means that usually many sources have had manifold impacts on existing phenomena, and these sources and impacts can be traced back. An important criterion for the inclusion into the list of contributions to the design of a joint action space should be whether participants find it relevant as part of their current clarification processes. Negotiating what is relevant encourages participants to articulate their assumptions about important issues such as inclusion and exclusion. This helps clarify what common objectives are and which steps are appropriate. The space allocated for this contribution does not allow to extensively treat phenomena crucial for the creation of joint action spaces, such as power, perspectives, interests, conflicts, cultures, participation etc. Considering, articulating and negotiating sources of impact on and contributions to the design of joint action spaces can serve as first and decisive steps toward creating joint action spaces in a beneficial manner. Once contributors have engaged in this kind of reflective and proactive activity they might derive inspiration for challenging taken-for-granted, seemingly eternal and unchangeable conditions, made up of constituents such as power relations, categories, exclusive practices and specifically set up computer systems.

Generating and using the checklists has been mentioned here as one of the many ways of proceeding. Many more ways remain to be reviewed and/or explored with respect to the design of joint action spaces. Contributors to joint action spaces should not hesitate to create as well as to adopt and creatively combine methods from already existing areas (such as participatory action research, participatory design, participatory planning, requirements engineering, software engineering, creative problem solving, mediation, group dynamics, supervision, the social sciences,...). The criterion should be that they are appropriate for the effort.

Outlook and Future Work

As pointed out, the collaborative collation and integration of design contributions (e.g. with checklists) and the negotiation of the tailoring and appropriation efforts of the supporting computer systems play an important role for the reflective design of joint action spaces.

Concerning the design of future computer support for joint action spaces, e.g. groupware systems, some issues remain open:

- How can we build systems that better support negotiation of the enclosing computer supported joint action spaces?
- How can we build systems that encourage and support individual and collective reflection and design contributions?
- How can 'group-wide' tailoring efforts become more transparent and inspiring instead of hindering or limiting the individual users' possibilities (see e.g. chapter Tailoring)?

Regarding the comprehensive reflection and negotiation of (not necessarily computer supported) joint action spaces we earlier presented the method of Narrative Transformation (Törpel & Poschen 2002; Törpel 2004) and an Online Workshop to negotiate a technological infrastructure (Pipek 2005).

As depicted in this contribution, traditional 'paper-and-pencil' meetings have been the basis for most of the reflective design activities and were possible due to the specific setting and limited geographical distribution of the participants. For more 'fragmented' settings where the participants are limited by higher geographical and / or temporal distribution, technologically inherent negotiation and reflection support of the groupware systems and CMC-tools used for communication and collaboration seems to be even more important.

Technology-use mediation

One challenge for the collaborative reflective design described in this paper have been the tailoring processes and results of the used groupware platform which resulted at first in the denial of several vital groupware-functions to the other participants due to erroneous access rights settings.

This is to our experience a quite common problem and we don't believe that these are merely misunderstandings or the result of a lack of (technical) training. Personal appropriation or individual learning of a new technological system is often a complex process, in which exploring and experimenting play a significant role and lead to a complex cluster of personal assumptions and expectations about a system's behaviour. As modern groupware and other CMC-tools are rather general-purpose media than specifically designed systems for a given organizational context, they must be adapted to it and adopted and appropriated by the relevant users including social norms and use conventions, otherwise "the technology will not reflect local conditions, work practices or communication norms and is, therefore, likely to be underutilized, misused or outright rejected." (Bansler & Havn 2003, 135)

One could Bansler & Havn (2003) in their renewal of the concept of "technology-use mediation" by Orlikowski et al. (1995) and concur that often an important aspect of these adaptation processes is carried out by technology-use mediators – one or more persons tailoring and adapting the systems to the local conditions, promoting system usage, helping other users and keeping an ongoing dialogue about how well the systems fulfils their needs, among others. This is not a neutral or merely facilitating task and can lead, as technology-use mediators are obviously themselves individuals with their own individual assumptions, expectations and goals, to quite different appropriations of the same technological system, as Bansler & Havn (2003, 140) point out.

Taking this into account it seems necessary to think about new ways of system-near support for reflection and negotiation based on the following assumptions:

- When introducing general-purpose groupware systems adaptation to the local conditions is necessary and often done by users from the local context.
- Some users are more likely to engage in technology-use mediation activities, whether based on formal delegation, different personal backgrounds, etc.
- The tailoring, adaptation and appropriation activities of these mediators can play a significant role and have diverse implications on the system and users as a whole (see e.g. the implications in chapter Tailoring).
- Technology-use mediators act on their individual experiences and assumptions often lacking technical and non-technical support for a change of perspectives or negotiation.

As mentioned above, the steering committee conceptualized various kinds of (then future) practices and different visions about systems usage which influenced the design of the groupware system, e.g. by pre-structuring folders, access rights and trainings. Manifested in the groupware system, these assumptions play a role as ‘affordances’ and (implicit or explicit) use conventions for everyone using the system, or more concrete, the specific workspaces.

The groupware system itself, however, had no explicit support of making these assumptions transparent or negotiable. Evolving use practices within the system had therefore to be made explicit in order to make them negotiable and feed them back to the underlying concepts and visions of future practices. This gap can significantly hinder the co-development of the joint-action spaces as (initial) visions and evolving use of groupware may drift apart.

One of the authors therefore started investigating a user-stories / scenario-based approach for reconnecting initial visions and concrete evolution of groupware usage and to support technology-use mediators with opportunities for changes of perspective and negotiation. This support concept is based on:

- Encouraging groupware users as technology-use mediators in explicating and sharing their visions, strategies and concepts, in both plain language and templates of concrete tailoring results,
- using Wiki-like technology for the collaborative writing and sharing of strategies and approaches in geographically distributed settings,
- creating a tailoring community based on these descriptions and templates,
- re-connecting initial visions with the concrete technological adaptation (e.g. setting of access rights, pre-structuring of folders, etc.) and providing a basis point to follow and reincorporate evolving use strategies and design contributions and
- allowing users to feedback appropriations and design contributions to the initial adaptation and tailoring efforts.

While most of the proposed actions alone existed before in some way or the other, they do not exist to our knowledge in an interconnected way within the users and / or technology-use mediators community of the groupware under scrutiny. Early results from scenario-workshops conducted with both ‘normal’ users and technology-use mediators resulted in user-stories and scenarios with a variety of different approaches and strategies even for the same organizational and technological settings, sometimes already resulting in the reconsideration or deliberation of new or alternative approaches based on new perspectives.

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